

AUTOMOTIVE



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PASSIVE SAFETY

CRASH FULL-SCALE & RESTRAINT SYSTEM DEVELOPMENT

CSI is one of the leading European laboratories that supply the full-scale crash test services for combustion engine, electrical and hybrid vehicles in accordance with the ECE, FMVSS, TRIAS and GB regulations.

The CSI laboratories are fully accredited by the Euro NCAP to perform the official rating tests. The following tests are run in the laboratory equipped with two independent crash lanes:

- Frontal crash tests
- Side crash tests
- Rear crash tests
- Sensor and insurance tests
- Dynamic roll-over tests for all 4 scenarios: embankment, corkscrew, curb trip, soil trip.

MAIN ACTIVITIES

CSI laboratories conduct an intensive effort in the development of the vehicle restraint systems:

- Analysis of the occupant interaction with the restraint systems
- Bio-mechanics correlated with the full-scale crash behavior.





BIW, COMPONENTS, OCCUPANT AND PEDESTRIAN PROTECTION

CSI is collaborating with major European and Asian OEM's in development and homologation of the occupant and pedestrian related safety solutions to be implemented in the vehicle. The range of available tests includes also components and chassis assessment related to passive safety.

Tests are conducted in accordance with the principal worldwide standards and Client specifications at the various product development stages:

OCCUPANT & PEDESTRIAN

- Adult and child head impact tests in accordance with Euro NCAP protocol and EU/TRIAS regulations
- Lower, Upper, Flex-PLI leg and aPLI tests
- Interior trim tests in accordance with EU regulations and FMVSS201U
- Out-of-Position (OOP) tests and Low-Risk Deployment (LRD) certifications
- Ejection Mitigation tests in accordance with FMVSS226.

COMPONENT & CHASSIS

- Seats and Headrests ECE R17 & FMVSS202
- Steering Wheels ECE R12 & FMVSS203
- Fuel tanks and fire testing ECE R34
- Dashboards and interior trim ECE R21 & FMVSS201
- Seatbelts and seats anchorage resistance tests ECE R14/17 & FMVSS210/207
- Roof crush in accordance with FMVSS216(a) and IIHS
- Side door intrusion in accordance with FMVSS214
- High Voltage Battery testing ECE R100.

ACTIVE SAFETY

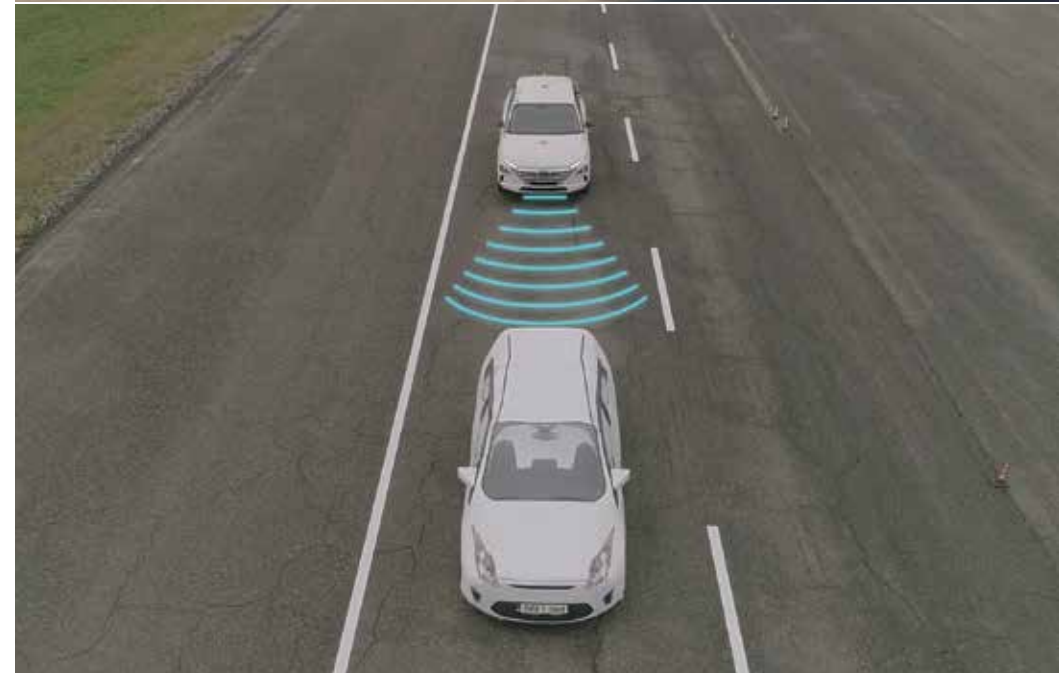
CSI has long-standing experience in the evaluation of braking system performances, in accordance with the applicable international standards. Skilled CSI technicians support their Clients with the evaluation and control of the electronic systems designed to enhance the braking efficiency and the stability of a motor vehicle.

DEVELOPMENT & CERTIFICATION TESTS

- Brake Efficiency tests: ABS & brake tests
- Brake Assistance Systems: Conditioning & performance
- Electronic Stability Systems (ESC) – EU & USA regulation tests.

EURO NCAP PROTOCOL

- Autonomous Emergency Breaking (AEB) tests
- Accident avoidance, Occupants protection and Road user protection (VRU), night testing and cyclist scenarios
- Driver Assistance Systems: MSA, ISA, SLIF, Blind Spot validation, Park Assistance systems, LDW/LKS
- Lane keeping/assist system and road edge detection
- Future NCAP 2023 test already available: crossing junction scenarios, rear AEB tests and high-speed maneuvers
- Autonomous Driving
- Main NCAP protocols (C-NCAP, K-NCAP, A-NCAP).





VEHICLE DYNAMICS

CSI provides a high-level support in the analysis, target setting and benchmarking in the vehicle dynamics.

It offers support and experience in:

CHASSIS AND SUSPENSION PERFORMANCE

Car Development Effort:

- Normal & High performance sports cars
- Special version of existing car
- Suspension development

Optimization & simulation

VEHICLE TESTING AND SIMULATION

- Model validation
- Handling
- Comfort

CSI offers turnkey service from drivers to solution proposal to meet your performance.

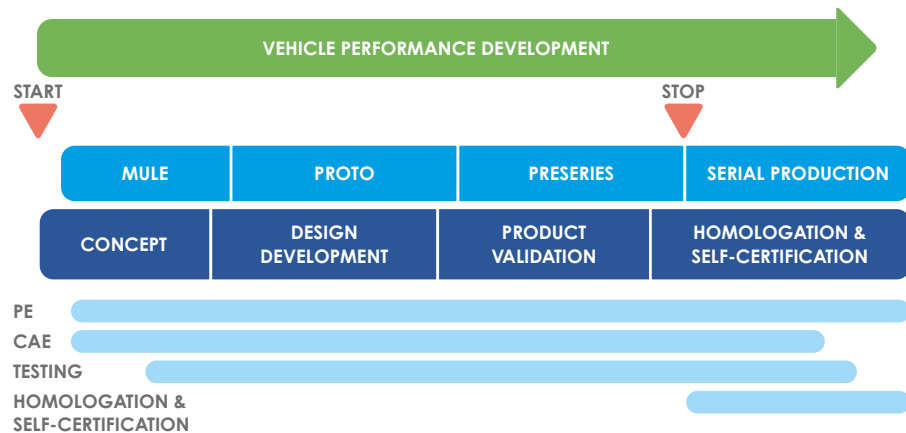
Expert drivers or, in case of needs of high repeatability and accuracy, driving robots, can perform all the relevant manoeuvres that are deeply analysed by our experts engineers.

VIRTUAL TESTING

CAE Services Department provides a full support to customers throughout all the phases of vehicle development. These services are concentrated on, most of all, car systems and components.

The virtual simulation service integrated with the testing department generates a solid base of know-how and high predictivity results.

OUR SERVICES RANGE



CAE & TESTING ACTIVITIES

PASSIVE AND ACTIVE SAFETY

NVH

VEHICLE DYNAMICS

DURABILITY

RESOURCES

- LABORATORIES
- PE & CAE

HOMOLOGATION

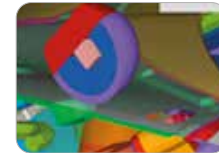
SELF-CERTIFICATION



SIDE SLED TEST



PEDESTRIAN



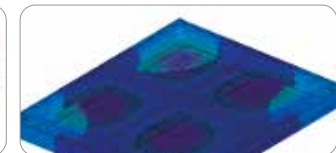
BIOMECHANICS & FULL SCALE



CRS



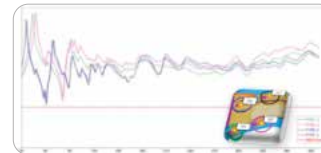
BATTERY SIMULATION



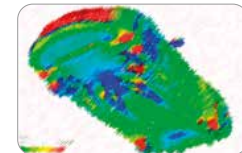
ROLL OVER



NVH (e.g. Stiffness & Acoustic)



AERODYNAMICS



NHV

By relying on teams of highly skilled technicians, CSI laboratories are able to support each and every stage of vehicle development in the field of Noise & Vibration Harshness (NVH).

NVH-related activities are carried out both in ad hoc laboratories and outdoors, on CSI tracks paved with special materials.

- Interior noise tuning
- Exterior noise (pass-by track) Induced vibration noise
- Vibration fatigue
- Vibrational comfort of different systems & components (seat, steering, driveline, suspension, gear, engine, ...)
- External/Internal Noise in Stationary Conditions: Heater, AC, S&S, ...
- Diagnosis and trouble-shooting
- Structural modal analysis



CSI LABORATORIES

VALIDATION AND QUALIFICATION OF SYSTEMS AND COMPONENTS

CSI offers its customers a team of highly qualified technicians in addition to a wide range of labs and equipment to develop complex systems.

THE MAIN TESTING AREAS ARE

- Validation & Durability on Full Vehicle & Subsystems/Components
- Environmental, Endurance, Vibration & Climatic Tests
- Thermal Shock
- Material Analysis
- Life test on Electric/Electronic Components
- EMC Tests
- Benchmark & target setting activities
- Corrosion Test under Salt Fog & Dust Test
- Diagnosis & Problem Solving



CSI LABORATORIES

VALIDATION AND QUALIFICATION OF ELECTRONIC SYSTEMS AND COMPONENTS

The CSI Electronic labs are able to support during the phases of development and product integration.

MAIN ACTIVITIES

- Functional tests on components & systems
- Heat & structural fatigue
- Communication protocols diagnosis on CAN, LIN, Flex-ray and MOST networks
- Tests on navigation systems & infotainment
- EMC tests on vehicles & components
- Accelerated aging
- Test on high voltage batteries (including ECE 100 certification)

MAIN FEATURES

- Up to 147 battery test channels (max. 500kW/1200V/1000A)
- 13 climatic chambers from 0,3 m³ up to 220 m³
- 5 vibrating tables (max. payload 800 kg)



VEHICLE DATA ACQUISITION AND MANAGEMENT

RE.VE.A.L.® CONNECTED SERVICES



200 million kilometers

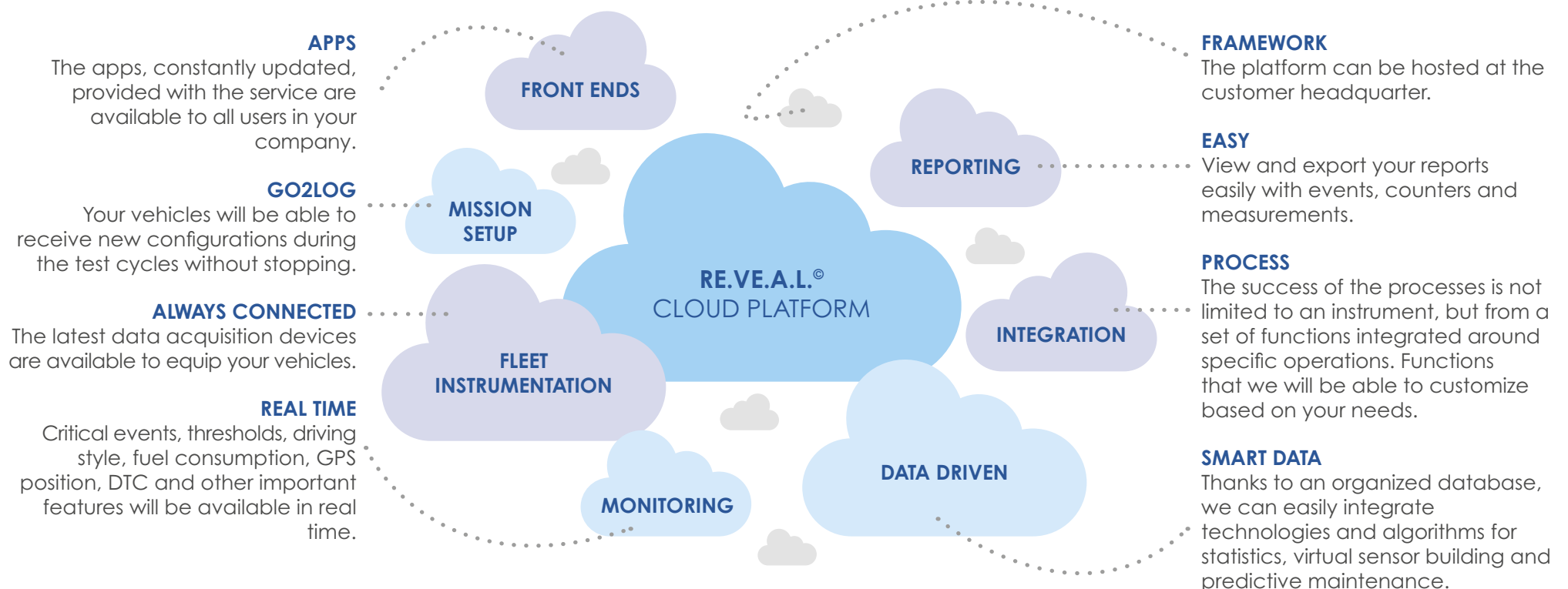


260 vehicles/month instrumented



Terabytes of acquired data

REAL-TIME VEHICLE DATA ANALYSIS AND LOCALIZATION



VEHICLE VALIDATION

DURABILITY AND RELIABILITY GROWTH

CSI manages all phases of testing, from the first durability and validation tests on mules, to reliability growth and durability. Activities include the validation of complex systems such as ADAS and Infotainment components, in order to assess the behavior of vehicles in their real environment. Tests are carried out worldwide taking into account various scenarios and allow to achieve validation of automotive product performance through a comprehensive evaluation.



300.000.000 km on cars



55.000.000 km on industrial vehicles



2.500.000 km on motorbikes



220 elaborated internal test standards



EMISSIONS

RDE LD, HD & GREEN NCAP



GREEN NCAP

- Member of board technical regulations
- New protocols and standard evolution road map 2030

RDE TESTS FOR

- Calibration development
- Fleet calibration robustness validation
- Homologation
- In use conformity

STANDARDS

- Eu 2018/1832 RDE LD Pack4
- Eu 2018/932 RDE HD
- Customizing OEM requirements



HOMOLOGATION

TYPE APPROVAL & CERTIFICATION

As a designated Technical Service for European Type-Approval Authorities **KBA** (Germany, "E1" mark), **RDW** (Netherlands, "E4" mark) and **NSAI** (Ireland, "E24" mark), CSI offers a complete Type-Approval service for the European market.

Thanks to recent partnerships, CSI can support the Manufacturers in order to obtain Type-Approval certificates issued by the Approval Authorities of **Luxembourg** ("E13" mark), **Cyprus** ("E49" mark) and **Sweden** ("E5" mark) as well.

Thanks to the extensive experience in the automotive field and the solid track record as a certification body and relying on its ISO 17025 accredited test facilities and ISO 17020 inspection body, CSI can offer to every application in the automotive market a complete approach to Type-Approval.

In this context, CSI supports its Customers in the step-by-step process, ranging from the compliance verification tests to the technical documentation review, with the purpose of obtaining the final Type-Approval certificate for the submitted product or vehicle, ensuring an effective management of all the involved activities.



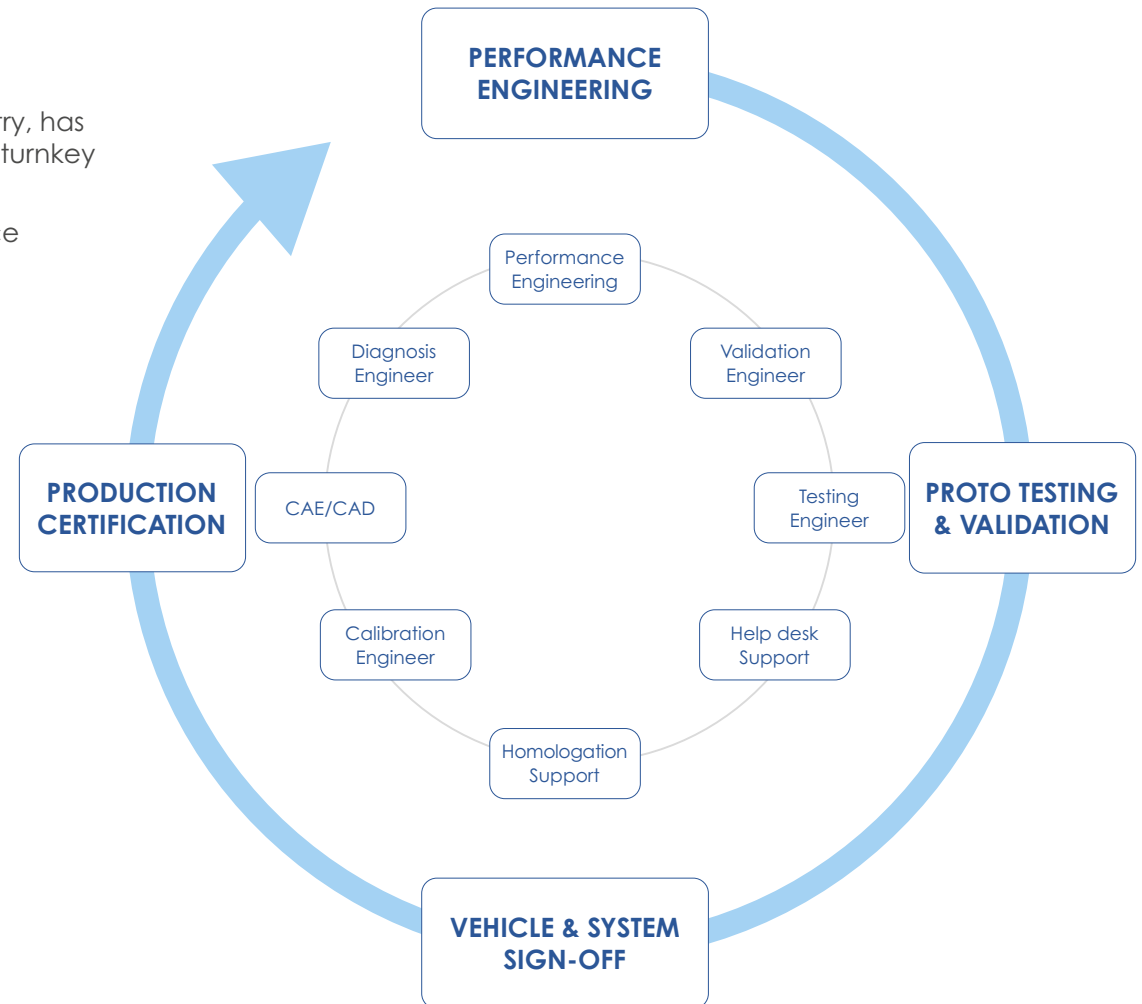
CUSTOMIZED SPECIAL PROJECT

RESIDENT ENGINEERING

PEOPLE MAKE THE DIFFERENCE

CSI, with more than 20 years of experience in the automotive industry, has the know-how to support its Clients in every challenge with specific turnkey project, designed and sewed on customer'needs.

CSI gives technical and organizational support in each performance development with teams of specialists.





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